MYCOTAXON

Volume 109, pp. 239–243 *July–September 2009*

Lichenochora atrans (*Phyllachoraceae*), a new lichenicolous species on *Psora decipiens* from Turkey

Mehmet Gökhan Halici[1], Kerry Knudsen[2] & Mehmet Candan[3]

[1]*mghalici@erciyes.edu.tr*
Erciyes Universitesi, Fen Edebiyat Fakültesi, Biyoloji Bölümü
38039 Kayseri, TURKEY

[2]*kk999@msn.com*
The Herbarium, Dept. of Botany & Plant Sciences, University of California
Riverside, California 92521

[3]*mecandan@anadolu.edu.tr*
Anadolu Üniversitesi, Fen Fakültesi, Biyoloji Bölümü
Eskişehir, TURKEY

Abstract — *Lichenochora atrans* sp. nov. is described on terricolous *Psora decipiens* from western Turkey. It is the fourth species of the genus that has simple ascospores. The other three species, *L. collematum*, *L. thorii* and *L. verrucicola,* have much smaller ascospores in size, and only *L. thorii* has pigmented mature ascospores like *L. atrans*. *Lichenochora atrans* is also unique in the genus by having largest ascomata and ascospores.

Key words — *Ascomycota*, lichenicolous fungi, lichens

Introduction

Lichenochora Hafellner in *Phyllachoraceae* (Lumbsch & Huhndorf 2007) is a common genus of lichenicolous fungi currently containing 31 species (Hafellner 1989, Etayo & Navarro-Rosinés 2008, Etayo & Sancho 2008, Zhurbenko 2008). A key to the genus was recently published (Etayo & Navarro-Rosinés 2008) comprising 30 species, not including the recently published *L. thorii* Zhurb.

The genus has perithecia with thin walls of round to polygonal cells formed of two layers, the outer dark, the interior hyaline. They are gall-forming in some species and the mycelium is dark or hyaline, immersed in thallus of the host. The exciple hyphae around the ostiole in many species form prominent papillae or hyphal appendages. The hamathecium consists of periphyses and delicate paraphyses. The paraphyses are branching or not, often as thick as 8 µm, and usually dissolving in mature perithecia. The ascal wall and hymenial gel are I – and the ascomatal cavity is inspersed with lipid drops. Asci are functionally

unitunicate, stalked, with 2 to 8 ascospores per ascus. Ascospores are hyaline, non-septate to pluriseptate, of various shape and sizes, sometimes with a perispore that can be pigmented, the ascospores appearing shades of gray to brown. The genus is specific to particular genera or groups of species within a genus.

We describe a new species of *Lichenochora* from Turkey on *Psora decipiens*. It is the fourth species with non-septate ascospores and the perispore is pigmented dark brown in mature ascospores. We first considered placing this new taxon in *Roselliniella,* which has many species with simple dark ascospores as well as several species with ascospores larger or as large such as *R. africana* Diederich (Aptroot et al. 1997) or *R. cladoniae* (Anzi) Matzer & Hafellner (Matzer & Hafellner 1990) and has thick vegetative hyphae, two-walled ascomata, a hamathecium with periphyses and thick paraphyses, lacks papillae and hyphal appendages around the ostiole, and can have paraphyses with abundant lipid drops (Matzer & Hafellner 1990). But our taxon contained abundant lipid drops in the wall and cavity of the ascomata as do all *Lichenochora,* which also have thick vegetative hyphae, two-walled ascomata, and a hamathecium with periphyses and thick paraphyses.

As first proposed, *Lichenochora* incorporated two species that may develop light brown 1-septate ascospores when over-mature — *L. galligena* R. Sant. & Hafellner and *L. polycoccoides* Hafellner & R. Sant. (Hafellner 1989). Hoffmann & Hafellner (2000) emended *Lichenochora* to include species with simple ascospores, while adding *Lichenochora thorii* Zhurbenko (2008) incorporated species with ascospores that are olive-brown when mature. Our taxon's perispore first matures to an olive-green (like *L. thorii*) but then becomes a darker brown. The first species lacking papillae or hyphal appendages in the ostiole region was *L. mediterraneae* Calat. et al. (Calatayud et al. 2000). Considering these developments in the concept of the genus *Lichenochora*, we placed our new taxon in *Lichenochora*. Nonetheless, while studying both *Lichenochora* and *Roselliniella* we have begun to question the systematic placement of *Lichenochora* in *Phyllachoraceae* while *Roselliniella* is placed in the *Sordariales* among the genera incertae sedis (Lumbsch & Huhndorf 2007).

Material and methods

The type material of the new species is deposited in ANES. Specimens were examined with an Olympus BH-2 research microscope fitted with Nomarski differential interference contrast optics and a drawing tube. Photomicrographs were prepared on a Nikon Eclipse 80i. Sections were prepared by hand and examined in I (Merck Lugol's iodine and water. Ascospore measurements were made in water. Ascospore and asci measurements were given as: (min.) (X–SD) –*X*– (X + SD) (max.), where min. and max. are the extreme values, X = the

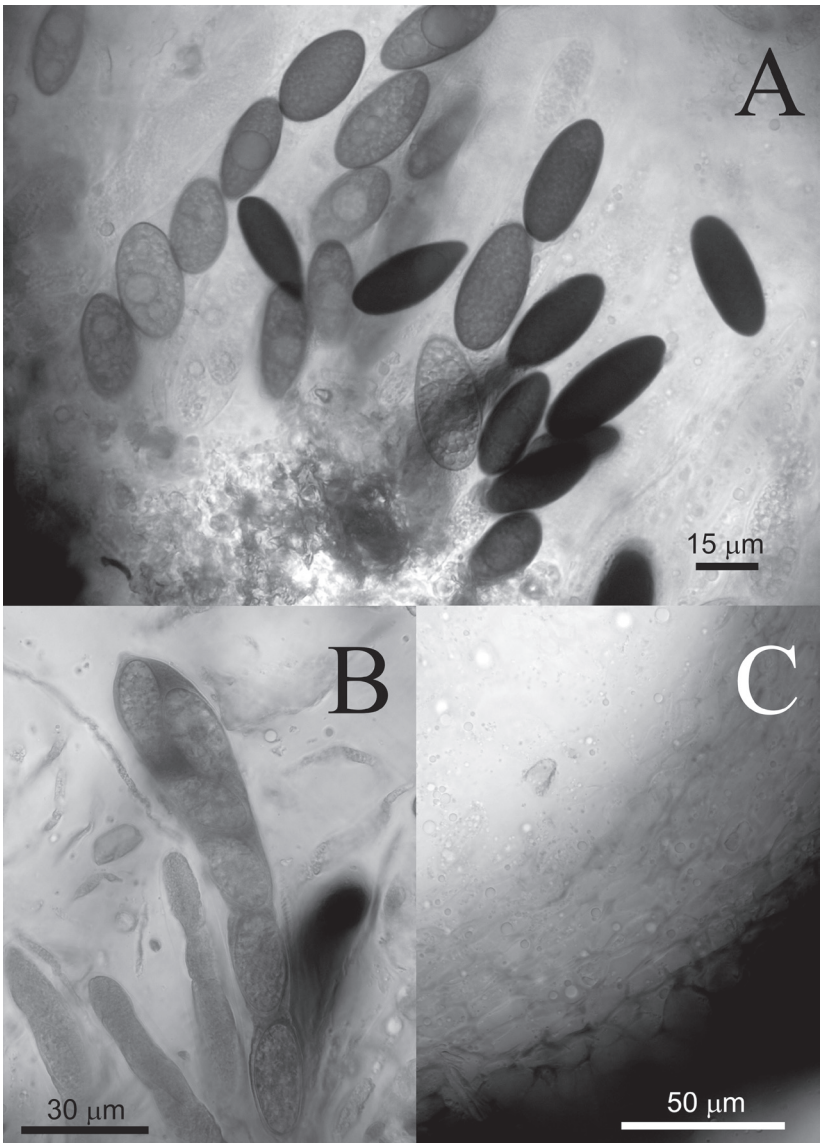

Fig. 1. *Lichenochora atrans* (holotype). A, Ascospores; B, 6-spored ascus in I; C, Ascomata walls and lipid droplets.

arithmetic mean, and SD = the corresponding standard division. The length/breadth ratio of ascospore is indicated as l/b and given in the same way.

The species

Lichenochora atrans Halici, K. Knudsen & Candan, **sp. nov.** FIGURE 1

MYCOBANK MB 513414

Fungus lichenicola. Speciei Lichenochora thorii *similis, sed differt in ascomatibus et ascosporis majoribus. Ascomata 400–600 µm diam. et ascosporae (30–)31.75–36.5–41.25(–48) × (13–)14–16–18(–21) µm.*

TYPE: Turkey, Afyon, Sandıklı, South-west of Celiloğlu Village, open area, 38°22'N, 30°08'E, alt. 1250 m, on thallus of *Psora decipiens* on soil, 5 June 2008, leg. M. Candan (ANES 12279 – **holotype**).

ETYMOLOGY: The specific name refers to the darkening of the perispore in mature ascospores.

DESCRIPTION: Lichenicolous, on the margins of the squamules and on underside of the squamules of *Psora decipiens*, not forming galls. VEGETATIVE HYPHAE immersed, reddish brown, 4–5 µm in diameter. ASCOMATA perithecioid, arising singly, immersed with only the ostiole and surrounding zone externally visible, to semi-immersed, 400–600 µm diam., black, subglobose to pyriform. EXCIPLE pseudoparenchymatous, 30–50(–60) µm thick, evenly thickened throughout; in vertical section through the ostiole, made up of two different layers: the outer one dark reddish brown, with 4–7 layers of tangentially flattened isodiametric cells, and the inner one, pale brown to colourless, with 4–6 layers of cells; (5–)7–10 × (3–)5–8(–9) µm in size, with lipid droplets in various sizes in almost all cells, especially in the colourless cells. No papillae or hyphal appendages observed. HYMENIUM colourless, I –, with abundant lipid droplets relatively large, 4–8(–10) µm diam. HAMATHECIUM made up of periphyses and paraphyses. Periphyses persistent, mostly unbranched, abundant along all the ostiolar channel, 15–20 × 3–5 µm. Paraphyses 4–6.5 µm thick, septate, simple or ramified, with many lipid droplets inside, only visible among immature asci, dissolving in mature perithecia. ASCI cylindrical-clavate, with a thin wall, not or almost not thickened at the apex, shortly stalked, unitunicate, 8–spored in the young asci, 4–6–spored in the mature asci, epiplasm dextrinoid, I + orange-red, (70–)89–*104*–119(–125) × (15–)16–*19*–22(–25) µm (*n* = 20). ASCOSPORES ± uniseriately arranged in the mature asci, ellipsoid, non-septate, usually one large lipid droplet and many small lipid droplets present, perispore present, smooth, pigmented dark brown in mature ascospores, rounded to somewhat broadly pointed at the apices, (30–)31.75–*36.5*–41.25(–48) × (13–)14–*16*–18(–21) µm (*n* = 40), l/b = (1.75–)2.02–2.26–2.50(–2.90), all measurements and ratio including the perispore. CONIDIOMATA not observed.

ECOLOGY AND DISTRIBUTION: *Lichenochora atrans* seems to be parasymbiotic as no damage to the host lichen was observed, but more collections are necessary to confirm this. The species is only known from the type locality. The type locality has a typical step vegetation with relict *Quercus* trees. The host

lichen, *Psora decipiens* is abundant on the open soil between small siliceous rocks. Other terricolous lichens occur with *Psora decipiens* including *Aspicilia hispida*, *A. desertorum*, *Cetraria aculeata*, *Cladonia foliacea*, *Diploschistes muscorum*, *Acarospora schleicheri* (parasitic on *Diploschistes muscorum*), and *Xanthoparmelia pokornyi* in the type locality.

Observations: *Lichenochora atrans* is the first species of the genus recognized on the host lichen family *Psoraceae*.

Only three other *Lichenochora* species have simple ascospores: *L. collematum* Nik. Hoffm. & Hafellner, *L. thorii* Zhurb. and *L. verrucicola* (Wedd.) Nik. Hoffm. & Hafellner (Etayo & Navarro-Rosinés 2008, Hoffmann & Hafellner 2000, Zhurbenko 2008). *L. collematum* and *L. verrucicola* differ from *L. atrans* by their gall-inducing life habit on different lichen hosts and colourless ascospores of much smaller sizes. *L. thorii*, a recently described parasymbiotic species on *Aspicilia moenium* has also simple and pigmented ascospores, but this species differs from *L. atrans* in having much smaller ascospores [(10–)13.5–*15.5*–17.5(–22) × (4–)4.5–*5*–5.5(–6.5) µm vs. (30–)31.75–*36.5*–41.25(–48) × (13–)14–*16*–18(–21) µm] and much smaller ascomata [150–300 µm vs. 400–600 µm] (Zhurbenko 2008).

Acknowledgements

Javier Etayo and Jana Kocourková are thanked for reviewing this paper. MC thanks TÜBİTAK (107T605 coded project) for providing financial support and Ayşen Türk for her help in the project. Okan Sezer is thanked for his help in preparing the figure.

Literature cited

Aptroot A, Diederich P, Sérusiaux E, Sipman HJM. 1997. Lichens and Lichenicolous Fungi from New Guinea. Bibliotheca Lichenologica, 64: 1–220.

Calatayud V, Navarro-Rosinés P, Calvo E. 2000. *Lichenochora mediterraneae* (*Phyllachorales, Ascomycota*), a new lichenicolous fungus from Spain. Lichenologist 32(3): 225–231.

Etayo J, Navarro-Rosinés P. 2008. Una combinación y tres especies nuevas de *Lichenochora* (*Phyllachorales*, *Ascomicetes* liquenícolas), y notas adicionales para el género. Revista Catalana de Micología 30: 27–44.

Etayo J, Sancho LG. 2008. Hongos liquenícolas del Sur de Sudamérica, especialmente de Isla Navarino (Chile). Bibliotheca Lichenologica 98: 1–302.

Hafellner J. 1989. Studien über lichenicole Pilze und Flechten VII. Uber die neue Gattung *Lichenochora* (*Ascomycetes*, *Phyllachorales*). Nova Hedwigia 48: 357–370.

Hoffmann N, Hafellner J. 2000. Eine Revision der lichenicolen Arten der Sammelgattungen *Guignardia* und *Physalospora* (*Ascomycotina*). Bibliotheca Lichenologica 77: 1–180.

Lumbsch HT, Huhndorf SM. (eds.) 2007. Outline of *Ascomycota* – 2007. Myconet 13: 1–58.

Matzer M, Hafellner J. 1990. Eine Revision der lichenicolen Arten der Sammelgattung Rosellinia (Ascomycetes). Bibliotheca Lichenologica 37: 1–138.

Zhurbenko M. 2008. *Lichenochora thorii* (*Phyllachorales*), a new lichenicolous *ascomycete* from Europe. Nova Hedwigia 87: 509–512.